Seeing that the true principle is to move ſlow and take quantity, *in the uſual trade*, it muſt be obſerved that a twenty-five ton boat is a limited quantity, and more cannot with propriety be applied to the horſe, conſequently he muſt reſort to ſpeed, and combat the reſiſtance.

Two twenty-five ton boats cannot be hooked to each other; as the helm of one will not govern the other, and they are too ponderous to be managed by a boat-hook; they are alſo ſo long that, in making the bends in the courſe of the canal, they ſeparate the fluid by ſide preſſure; the bow of the firſt ſeparates the fluid, *for inſtance*,

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other part, then the reſiſtance of the greater velocity will be nine times the reſiſtance of the leſſer; and if the velocity in one place be *four* times the velocity in another, the reſiſtance of the greater will be ſixteen times the reſiſtance of the leſſer, and ſo on. *See Chambers on Motion.*

Hence, as reſiſtance is more in proportion to velocity than weight; if I ſuppoſe a boat and cargo to weigh twenty tons moving at the rate of two miles per hour, ſhe will remove a certain number of particles in that time; if the weight is *doubled*, twice the number of particles will be removed, and the reſiſtance will, in conſequence, be double. But, as the ſpeed is not increaſed, all the reſiſtance which would ariſe from increaſed velocity, by the force with which the particles would be ſtruck, is avoided; therefore quantity, to create reſiſtance equal to what ſpeed produces, is nearly as follows: in which I will ſuppoſe a horſe to convey thirty-ſix tons at the rate of two miles per hour, and diminiſh the quantity as the ſpeed is increaſed.

Miles per hour.	*Square of reſiſtance from velocity.*	*Tons.*
2	4	36
3	9	16
4	16	9
5	25	6
6	36	4

Hence, as nine is to four in reſiſtance, ſo is ſixteen to thirty-ſix in quantity; and ſo on, in the ſucceeding numbers, the quantity diminiſhing as the ſpeed is increaſed; which determines, that to convey four tons ſix miles per hour, requires as much power as to convey thirty-ſix tons two miles in the ſame time: thus, although the ſpeed is but triple, the quantity is reduced to one ninth part, or as four is to thirty-ſix—and ſo on in the other numbers.

to the right, and the ſtern repels it to the left; the bow of the ſecond boat brings it to the right again, and then the ſtern drives it to the left; which agitation conſequently will retard the motion of both boats: hence, on a canal for twenty-five ton boats, one boat muſt be the allowance of one horſe; he cannot have more; but muſt endeavour to accompliſh quantity by ſpeed, and encounter the conſequent reſiſtance.

But of the four-ton boats, ten, fifteen, or twenty, may be linked together, to compoſe any weight which is thought proper, according to time and diſtance; being only twenty feet long they incline to the bendings of the canal like the links of a chain, and follow in the wake of each other, being guided by a man walking on the horſe-path with a boat-hook; hence, by the ſyſtem of ſmall boats, a horſe may take any quantity, and move with a proportionate velocity.

From boats of this conſtruction, another material advantage ariſes to proprietors of colleries, lime, delphs, &c.; frequently a canal may paſs near ſuch works; and yet it is inconvenient, or inconſiſtent, with the quantity of trade, to extend the water level to the very ſpot; which circumſtance frequently obliges ſuch proprietors to conſtruct rail-ways, and keep waggons, which they muſt be at the expence firſt of loading, before they can deliver the commodity to the boats, and frequently of forming a depoſit on the canal banks, from whence they muſt again load into the boats. But if ſuch works lie above the canal, and not more than ſix hundred yards diſtant, ſo that a regular deſcent could be obtained; a ſingle road might be formed, and the boat floating on additional wheels might be raiſed to the pit by the ſteam-engine employed in pumping, or by the mode deſcribed by D. in the Plate of Parts.

But if ſuch a regular declivity could not be obtained, ſuppoſing the aſcent was eaſy, the boat, on a carriage prepared for the pur-

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